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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/511,626

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EXAMINER

MACK, CHANELLE N

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/511,626	Applicant(s) NIHEI ET AL.	
	Examiner Chanelle N. Mack	Art Unit 2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) 6-9 and 14-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 10-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 10/511,626.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date: _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/18/2004</u> .  | 6) <input type="checkbox"/> Other: _____                          |

***Specification***

1. Applicant's election without traverse of claims 1-5 and 10-13 in the reply filed on July 10, 2007 is acknowledged.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uno, US 6,535,326 in view of Shingehiro, US 2002/0044333.
4. In accordance with claim 1, Uno teaches a display device, which has a first substrate that is made of PET, PES, glass, quartz, and so on, at least two display electrodes, a second substrate, a means for applying a voltage to each electrode, a plurality of colored particles that migrate between the first display electrode and the second display electrode, and projections formed on the display electrodes (**Figures 1, 8-10 and Column 10, Lines 2-6**).

Uno does not teach a pair of electrodes provided on respective substrates.

However, Shingehiro teaches an image display which has a first substrate that can transmit light, a second substrate, particles having different colors, electrodes on the first substrate and the second substrate, and a voltage applying unit (**Figure 1 and Page 2, Paragraph 23**).

Therefore it would have been obvious to one of ordinary skill in the art to combine Uno with Shingehiro to reach an image display panel, in which two or more groups of particles having different colors and different charge characteristics are sealed between two substrates, at least one of two substrates being transparent, and, in which the particles, to which an electrostatic field produced by a pair of electrodes provided on respective substrates is applied, are made to fly and move so as to display an image, characterized in that micro-concave portions and/or micro-convex portions are provided to a part of or an overall of a surface of the electrode for providing an image display that displays an image without unevenness having high contrast.

5. In reference to claim 2, Uno teaches an image display device, in which the pixel size is  $100\text{ }\mu\text{m} \times 100\text{ }\mu\text{m}$ , the average particle size is  $5\text{ }\mu\text{m}$ , the ratio of the area of each electrode to the total pixel area is 30% for the first display electrodes and 70% for the second display electrodes, and the projections of the respective display electrodes preferably have the height of not less than  $1\text{ }\mu\text{m}$  nor more than  $20\text{ }\mu\text{m}$  on each display electrode and the width of not less than 5% nor more than 20% of the width of the display electrode. Therefore the following formulas are satisfied:

average width/maximum average particle size  $> 2$ ; and

average height/maximum average particle size  $> 2$ ;

where a length across corner of a projection shape of the micro-concave portions and/or the micro-convex portions with respect to an electrode surface is assumed to be the average width, an average absolute value of a depth and/or a height of the micro-concave portions and the micro-convex portions is assumed to be the average height

(depth), and a largest average particle size among the two or more groups of particles is assumed to be the maximum average particle size (**Column 7, Lines 18-28**).

6. According to claim 3, Uno teaches an image display device in which a plurality of the micro-concave portions and/or the micro-convex portions are provided to the same electrode and an average distance between the portions is constructed to satisfy the formula; average distance/maximum average particle size < 50 (**Column 7, Lines 18-28**).

7. As per claim 4, Uno teaches an image display device in which the surface electrodes and the projections of the surface electrodes may be coated with a thin insulating layer (**Figures 8-10 and Column 7, Lines 7-14**).

8. With respect to claim 5, Uno teaches an image display device in which a gross area of the projection shapes of the micro-concave portions and/or the micro-convex portions on the electrode surface is 0.1 - 50 % with respect to an area of the electrode (**Column 7, Lines 18-28**).

9. Pertaining to claim 10, Uno teaches that there is no limitation to the particle size, but the particles are normally used in the particle size of about .05 $\mu$ m to 20 $\mu$ m.

Therefore, the average diameter of the particles is within the range of 0.1 to 50  $\mu$ m (**Column 11, Lines 1-6**).

10. As per claim 11, Uno teaches a display device, which has a first substrate, at least two display electrodes, a second substrate, a means for applying a voltage to each electrode, a plurality of colored particles that migrate between the first display electrode

and the second display electrode, and projections formed on the display electrodes **(Figures 1, 8-10).**

Uno does not teach a surface charge density of the particles measured by a carrier and in accordance with a blow-off method is not less than  $5 \mu\text{C}/\text{m}^2$  and not greater than  $150 \mu\text{C}/\text{m}^2$  in an absolute value.

However, Shingehiro teaches an image display device in which The average charge amount (fC per particle) is substantially proportional to square of the average particle diameter  $2r$  ( $\mu\text{m}$ ), and the smaller the average particle diameter is, the smaller the average charge amount is. Therefore, the preferred range of the average charge amount varies depending on the particle diameter. The average charge amount of the first particles is preferably from  $5 \times (r^2 \times 10^2)$  to  $150 \times (r^2 \times 10^2)$  fC per particle, and the average charge amount of the second particles is preferably from  $-150 \times (r^2 \times 10^2)$  to  $-5 \times (r^2 \times 10^2)$  fC per particle **(Page 3, Paragraph 32).**

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Uno and Shingehiro to obtain an image display device in which a surface charge density of the particles measured by a carrier and in accordance with a blow-off method is not less than  $5 \mu\text{C}/\text{m}^2$  and not greater than  $150 \mu\text{C}/\text{m}^2$  in an absolute value in order to have the proper response time to the electric field.

11. With respect to claim 13, Uno teach an image display device in which a color of the particles black **(Column 7, Lines 38-39).**

Art Unit: 2609

12. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uno, US 6,535,326 in view of Shingehiro, US 2002/0044333 as applied to claim 1 above, and further in view of Miyamoto, US 6,774,879.

13. In reference to claim 12, Uno teaches a display device, which has a first substrate, at least two display electrodes, a second substrate, a means for applying a voltage to each electrode, a plurality of colored particles that migrate between the first display electrode and the second display electrode, and projections formed on the display electrodes (**Figures 1, 8-10**).

Shingehiro teaches an image display which has a first substrate that can transmit light, a second substrate, particles having different colors, electrodes on the first substrate and the second substrate, and a voltage applying unit (**Figure 1 and Page 2, Paragraph 23**).

Uno nor Shingehiro teach an image display device wherein the particles are particles in which the maximum surface potential, in the case that the surface of particles is charged by a generation of Corona discharge caused by applying a voltage of 8 KV to a Corona discharge device deployed at a distance of 1 mm from the surface, is 300 V or greater at 0.3 second after the Corona discharge.

However, Miyamoto teaches a display device, which has a voltage of about 4 kV to about 10kv for generating Corona ions, which is 400 V at a distance of 1mm. (**Column 17, Lines 38-42 and Column 18, Lines 5-60**).

Hence, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Uno, Shingehiro and Miyamoto to

Art Unit: 2609

reach an image display device in which the maximum surface potential, in the case that the surface of particles is charged by a generation of Corona discharge caused by applying a voltage of 8 KV to a Corona discharge device deployed at a distance of 1 mm from the surface, is 300 V or greater at 0.3 second after the Corona discharge, which allows images to be written.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

15. Engler et al, US 6,700,695 teaches an image display device, which has convex portions provided to a part of or an overall surface of the electrodes.

16. Oba, US 6,333,754 teaches an image display device in which a large number of holes are formed to produce an image displaying medium for displaying fine images and improving contrast.

17. Nomura, US 6,985,132 teach an image display device, which has concave portions formed on the electrodes.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chanelle N. Mack whose telephone number is (571) 270-2600. The examiner can normally be reached on MON - FRI 8:00 - 4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571) 272-7687. The fax phone

Art Unit: 2609

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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